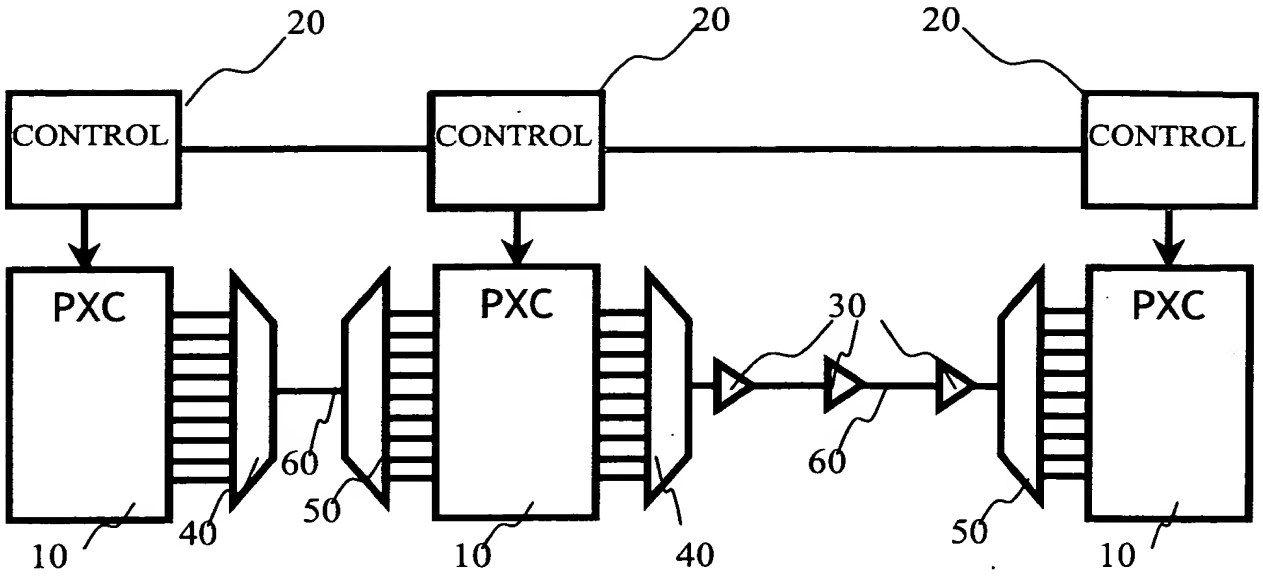


FIG. 1A, PRIOR ART

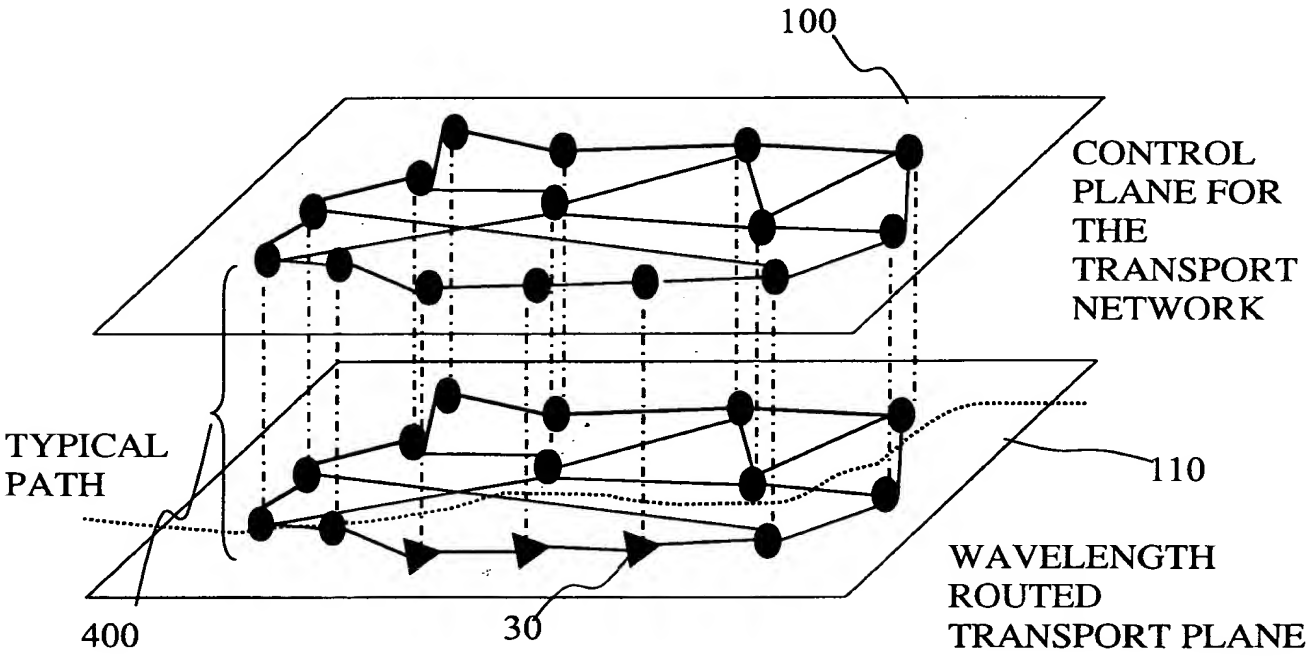


FIG. 1B, PRIOR ART

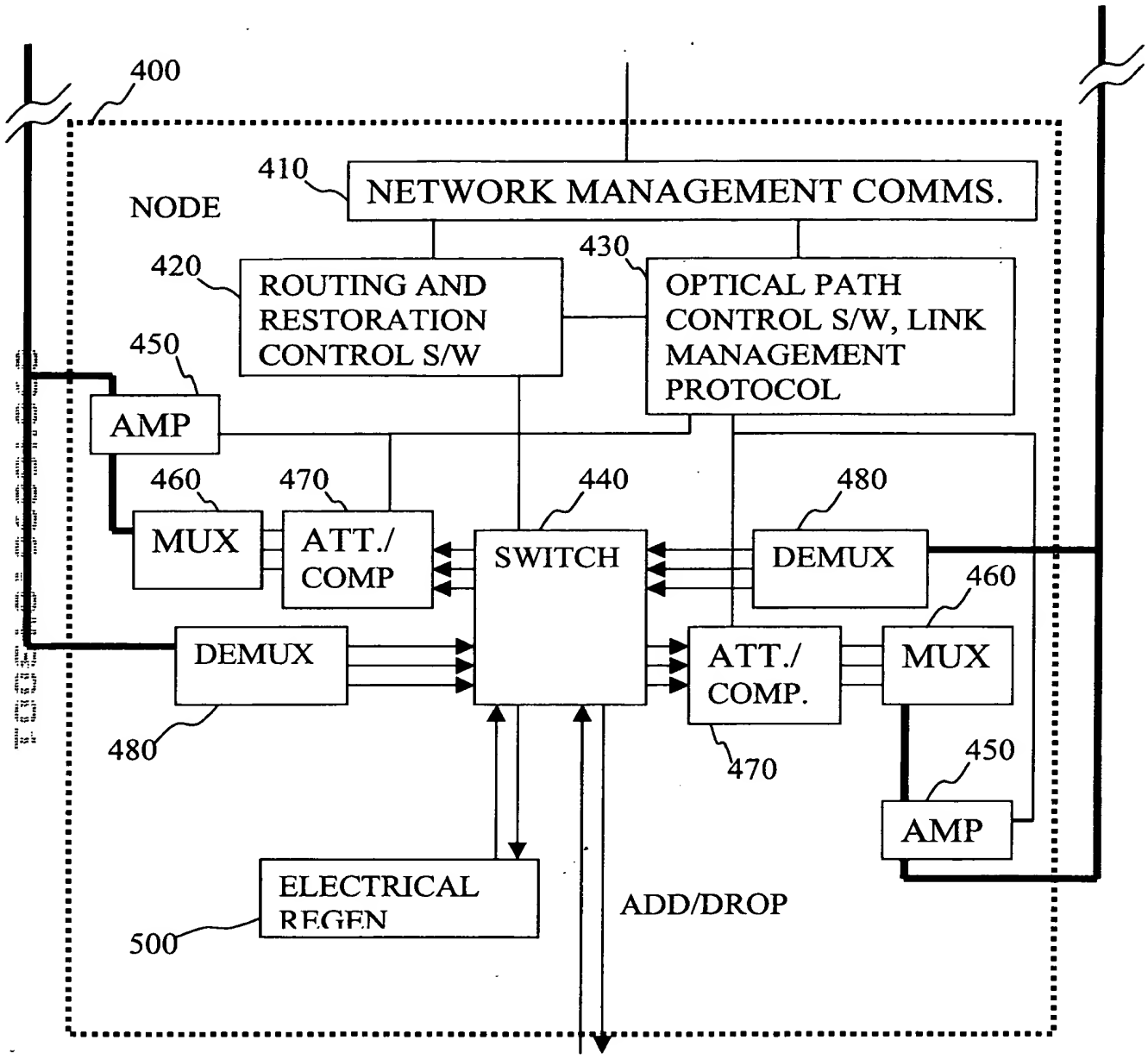


FIG. 2, PRIOR ART, OVERALL SCHEMATIC VIEW OF A NODE FOR USE IN THE WAVELENGTH ROUTED MESH NETWORK OF FIG. 1A OR 1B.

FIG. 3

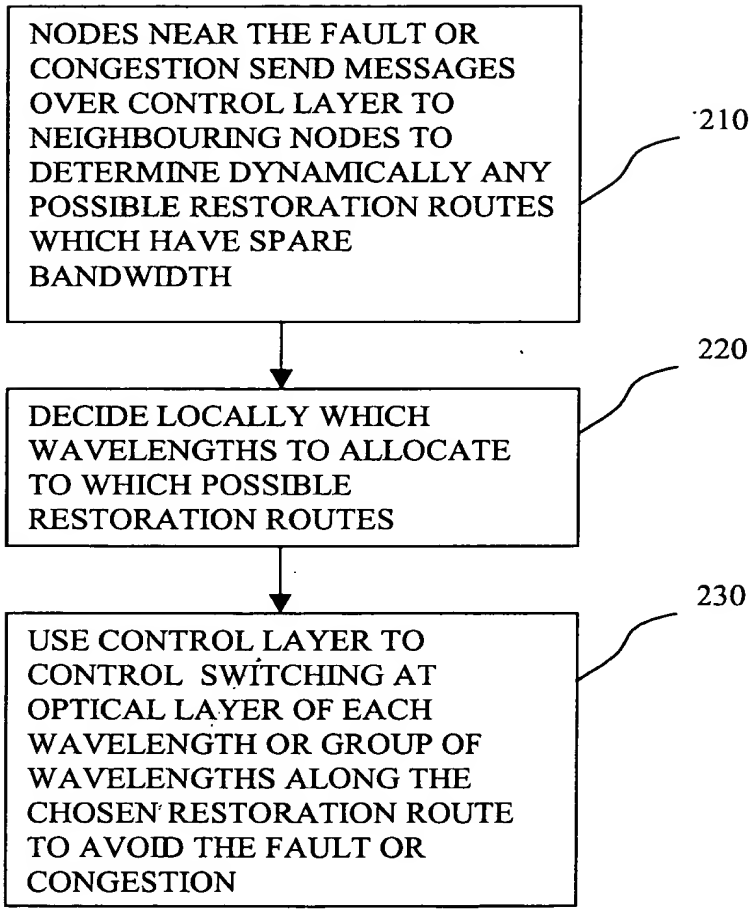

NODES NEAR THE FAULT OR CONGESTION SEND MESSAGES OVER CONTROL LAYER TO NEIGHBOURING NODES TO DETERMINE DYNAMICALLY ANY POSSIBLE RESTORATION ROUTES WHICH HAVE SPARE BANDWIDTH
210
DECIDE LOCALLY WHICH WAVELENGTHS TO ALLOCATE TO WHICH POSSIBLE RESTORATION ROUTES
220
USE CONTROL LAYER TO CONTROL SWITCHING AT OPTICAL LAYER OF EACH WAVELENGTH OR GROUP OF WAVELENGTHS ALONG THE CHOSEN RESTORATION ROUTE TO AVOID THE FAULT OR CONGESTION
230

FIG. 4

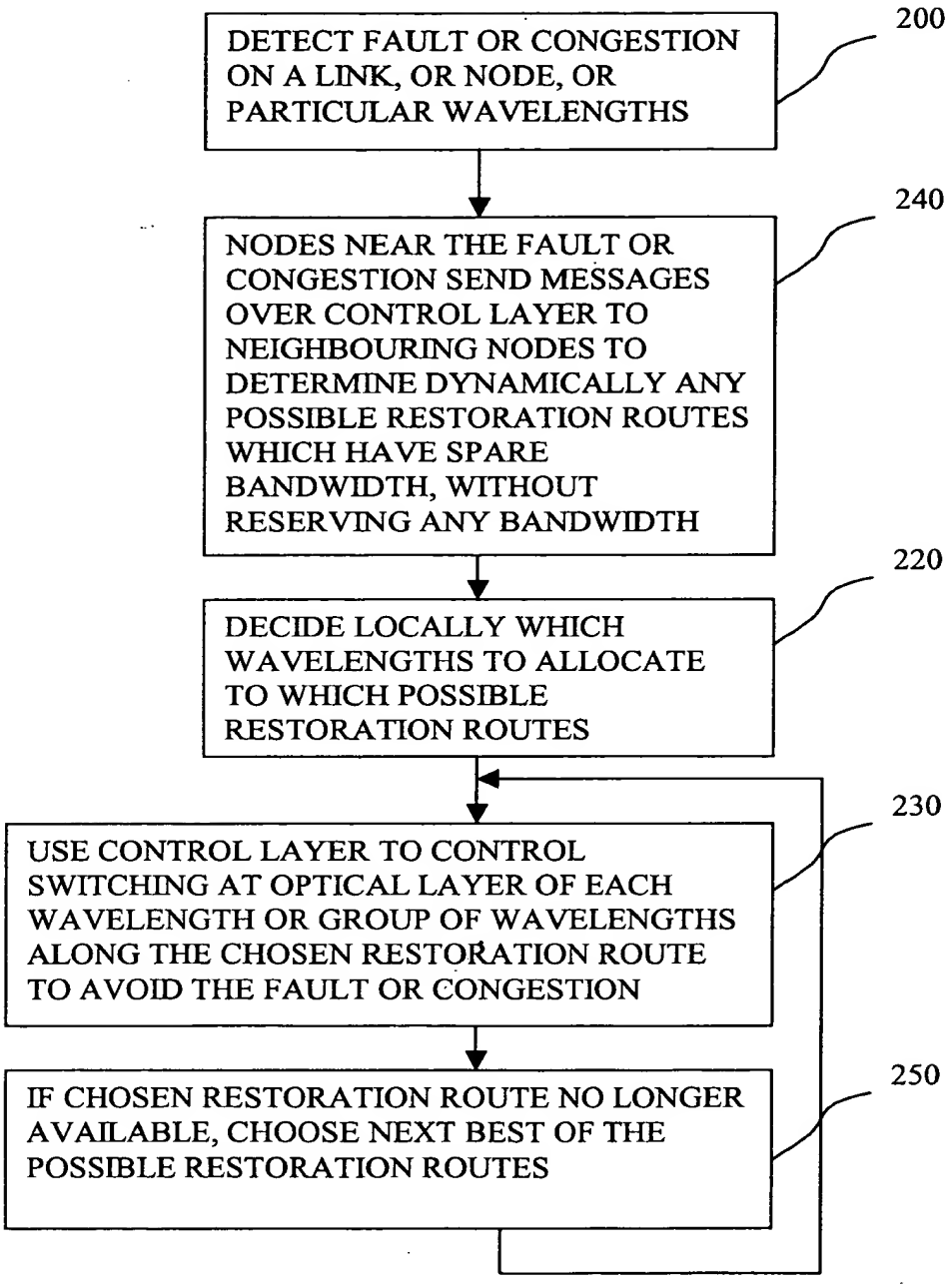
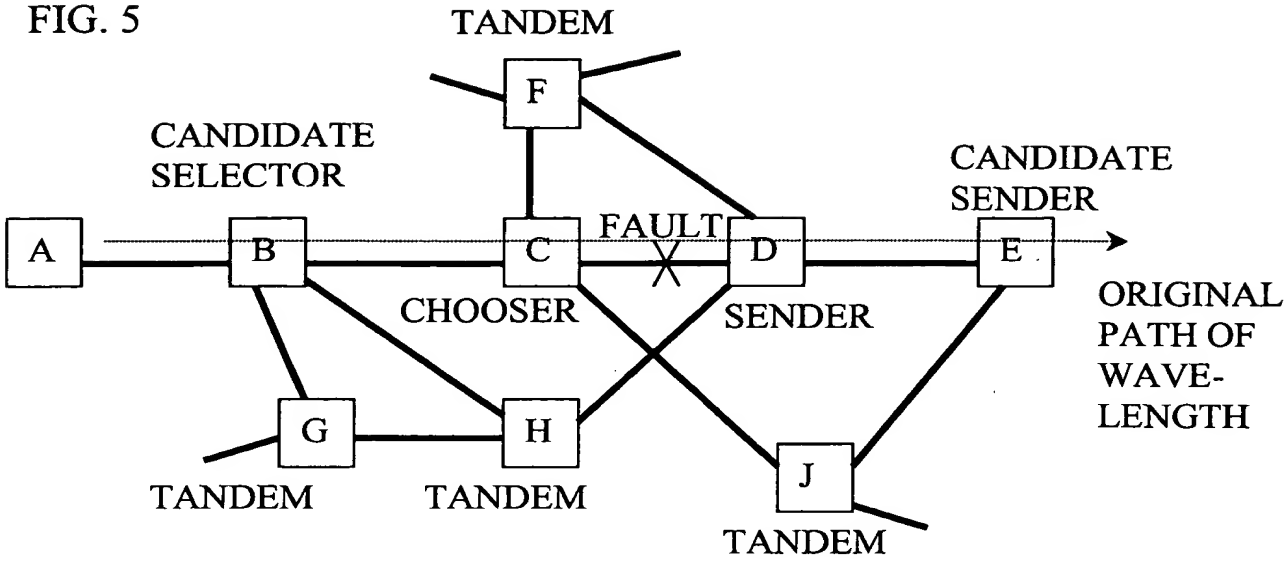

DETECT FAULT OR CONGESTION ON A LINK, OR NODE, OR PARTICULAR WAVELENGTHS
200
NODES NEAR THE FAULT OR CONGESTION SEND MESSAGES OVER CONTROL LAYER TO NEIGHBOURING NODES TO DETERMINE DYNAMICALLY ANY POSSIBLE RESTORATION ROUTES WHICH HAVE SPARE BANDWIDTH, WITHOUT RESERVING ANY BANDWIDTH
240
DECIDE LOCALLY WHICH WAVELENGTHS TO ALLOCATE TO WHICH POSSIBLE RESTORATION ROUTES
220
USE CONTROL LAYER TO CONTROL SWITCHING AT OPTICAL LAYER OF EACH WAVELENGTH OR GROUP OF WAVELENGTHS ALONG THE CHOSEN RESTORATION ROUTE TO AVOID THE FAULT OR CONGESTION
230
IF CHOSEN RESTORATION ROUTE NO LONGER AVAILABLE, CHOOSE NEXT BEST OF THE POSSIBLE RESTORATION ROUTES
250

FIG. 5



ROUTE	SPARE WAVE-LENGTHS	DISPERSION	LOSS	SNR
ABGHDE	BG=3 GH=4 HD=7	BG=10 GH=5 HD=2	BG=1.3 GH=4.1 HD=2.3	BG=4 GH=3 HD=2
ABCFDE	CF=1 FD=10	CF=1 FD=3	CF=4.1 FD=3.0	CF=5 FD=10
ABCJE	CJ=4 JE=3	CJ=4 JE=3	CJ=1.1 JE=3.2	CJ=4 JE=3
ABHDE	BH=1 HD=2	BH=5 HD=6	BH=2.2 HD=4.3	BH=4 HD=5

FIG. 6

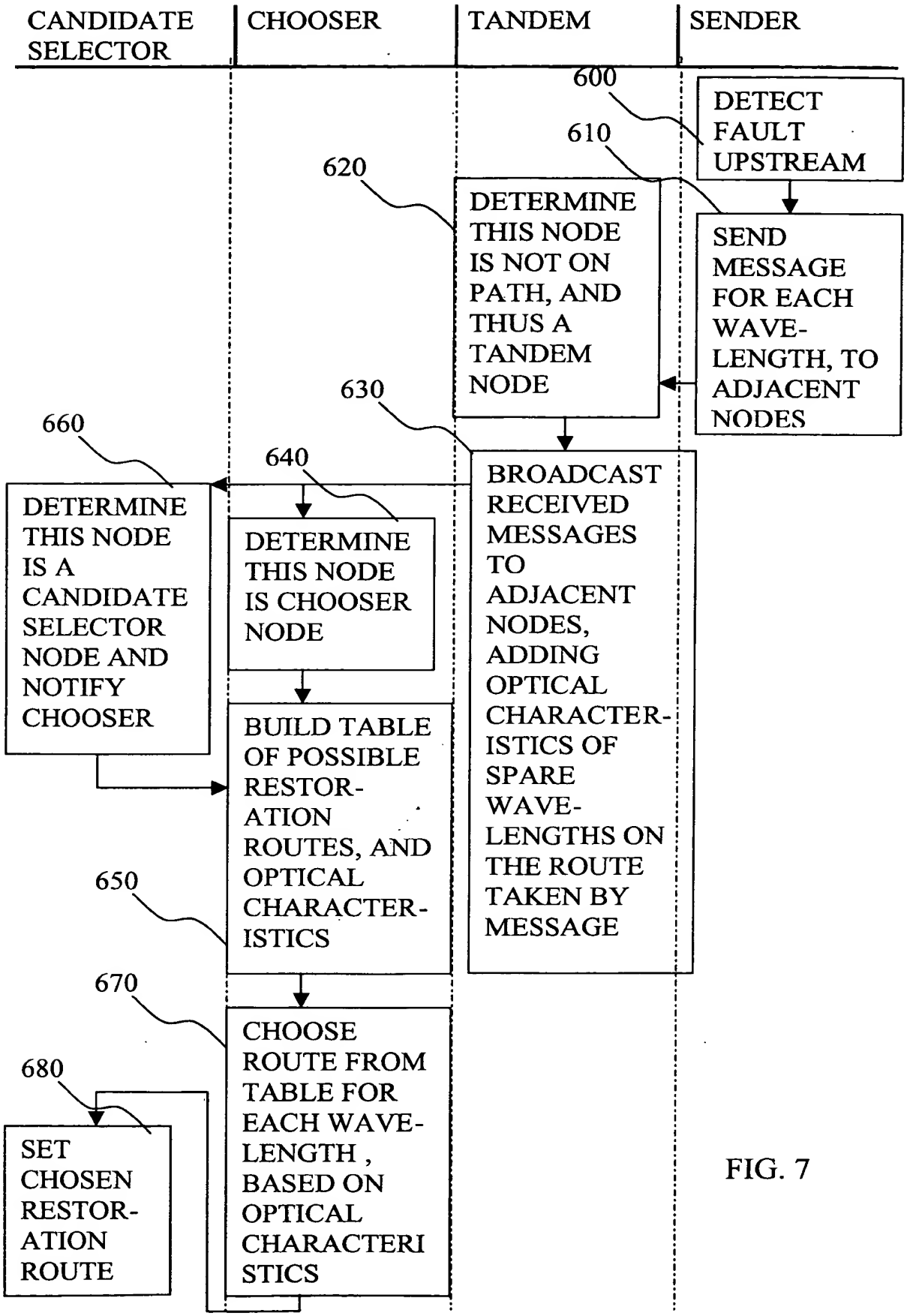

CANDIDATE SELECTOR
CHOOSER
TANDEM
SENDER
600
DETECT FAULT UPSTREAM
610
SEND MESSAGE FOR EACH WAVE-LENGTH, TO ADJACENT NODES
620
DETERMINE THIS NODE IS NOT ON PATH, AND THUS A TANDEM NODE
630
BROADCAST RECEIVED MESSAGES TO ADJACENT NODES, ADDING OPTICAL CHARACTER-ISTICS OF SPARE WAVE-LENGTHS ON THE ROUTE TAKEN BY MESSAGE
640
DETERMINE THIS NODE IS CHOOSER NODE
650
BUILD TABLE OF POSSIBLE RESTOR-ATION ROUTES, AND OPTICAL CHARACTER-ISTICS
660
DETERMINE THIS NODE IS A CANDIDATE SELECTOR NODE AND NOTIFY CHOOSER
670
CHOOSE ROUTE FROM TABLE FOR EACH WAVE-LENGTH , BASED ON OPTICAL CHARACTERI STICS
680
SET CHOSEN RESTOR-ATION ROUTE

FIG. 7

FIG. 8

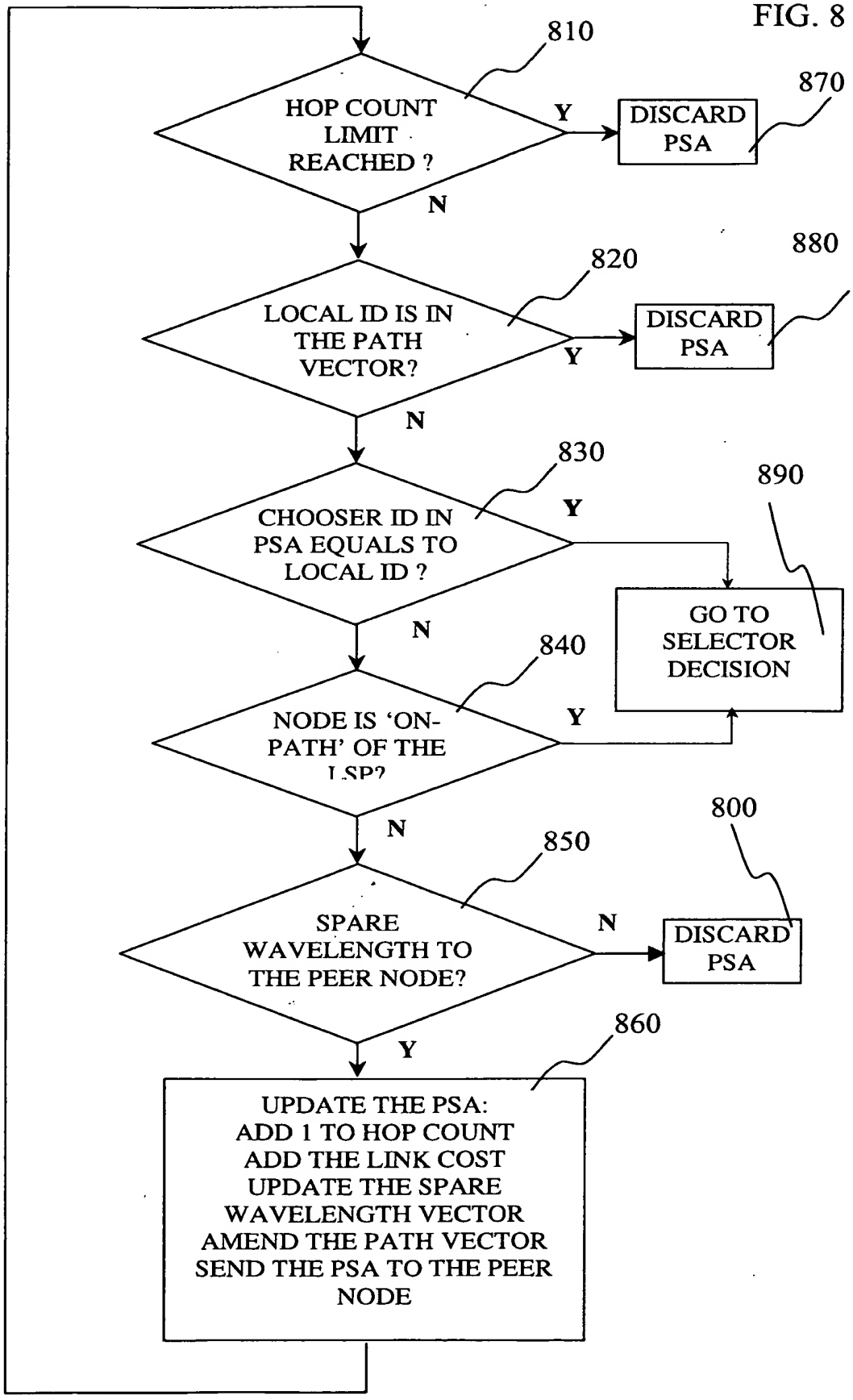

800
810
HOP COUNT LIMIT REACHED ?
Y
DISCARD PSA
870
N
820
LOCAL ID IS IN THE PATH VECTOR?
880
Y
DISCARD PSA
N
830
CHOOSER ID IN PSA EQUALS TO LOCAL ID ?
890
Y
GO TO SELECTOR DECISION
N
840
NODE IS 'ON-PATH' OF THE LSP?
Y
N
850
SPARE WAVELENGTH TO THE PEER NODE?
N
DISCARD PSA
Y
860
UPDATE THE PSA:
ADD 1 TO HOP COUNT
ADD THE LINK COST
UPDATE THE SPARE WAVELENGTH VECTOR
AMEND THE PATH VECTOR
SEND THE PSA TO THE PEER NODE

FIG. 9

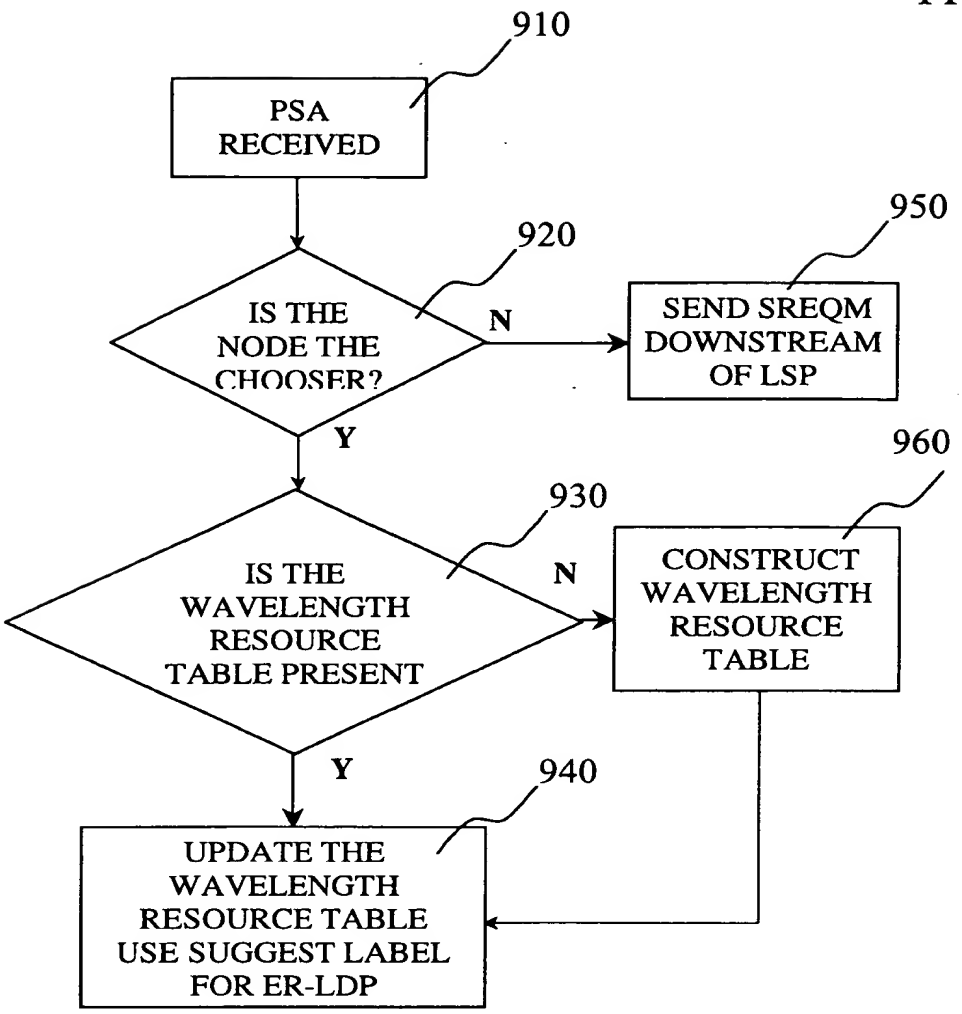

910
PSA RECEIVED
920
IS THE NODE THE CHOOSER?
N
950
SEND SREQM DOWNSTREAM OF LSP
Y
930
IS THE WAVELENGTH RESOURCE TABLE PRESENT
N
960
CONSTRUCT WAVELENGTH RESOURCE TABLE
Y
940
UPDATE THE WAVELENGTH RESOURCE TABLE USE SUGGEST LABEL FOR ER-LDP

FIG. 10

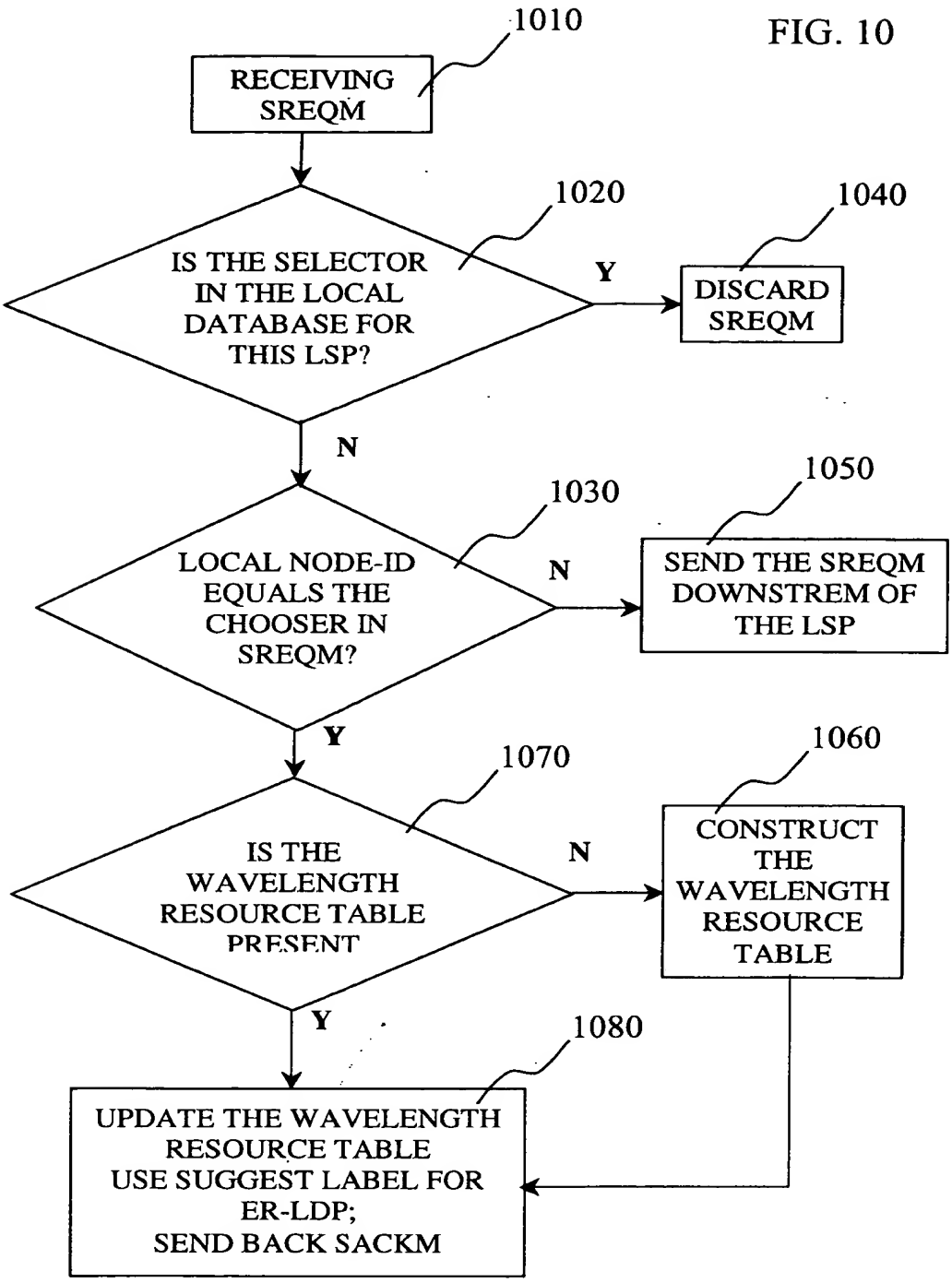

1010
RECEIVING SREQM
1020
IS THE SELECTOR IN THE LOCAL DATABASE FOR THIS LSP?
Y
1040
DISCARD SREQM
N
1030
LOCAL NODE-ID EQUALS THE CHOOSER IN SREQM?
N
1050
SEND THE SREQM DOWNSTREM OF THE LSP
Y
1070
IS THE WAVELENGTH RESOURCE TABLE PRESENT
N
1060
CONSTRUCT THE WAVELENGTH RESOURCE TABLE
Y
1080
UPDATE THE WAVELENGTH RESOURCE TABLE
USE SUGGEST LABEL FOR ER-LDP;
SEND BACK SACKM

FIG. 11

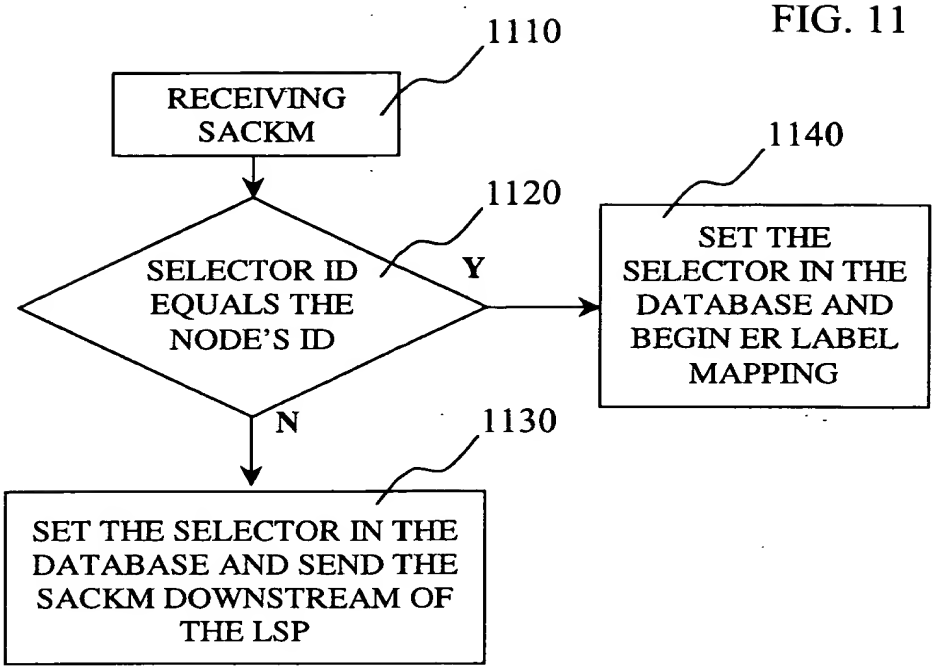
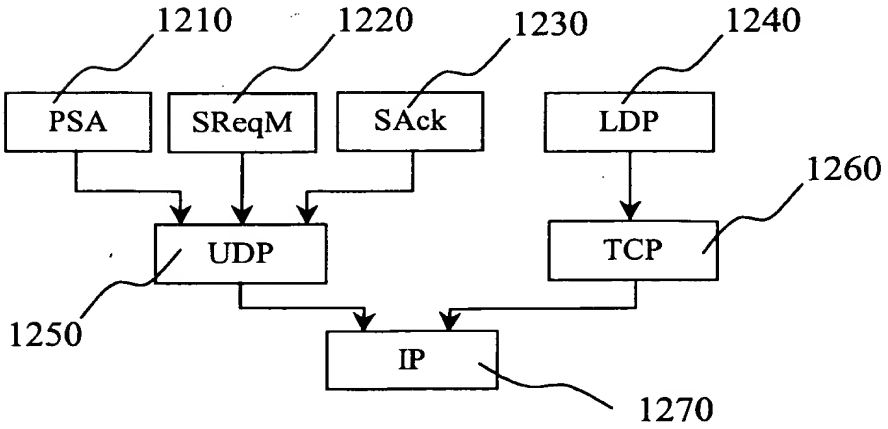

1110
RECEIVING SACKM
1120
SELECTOR ID EQUALS THE NODE'S ID
Y
N
1140
SET THE SELECTOR IN THE DATABASE AND BEGIN ER LABEL MAPPING
1130
SET THE SELECTOR IN THE DATABASE AND SEND THE SACKM DOWNSTREAM OF THE LSP

FIG. 12


1210
1220
1230
1240
PSA
SReqM
SAck
LDP
1260
UDP
TCP
1250
IP
1270